Electronic Version

Stylesheet Version v1.1.1

Claims

[c1] A method for dense and secure transmission of signals and information using a small number of channels, the method comprising

a) choosing an appropriate integer modulus m, positive integer n, corresponding to the number of bits to be encoding, and generating n x n matrix A with integer elements where the diagonal elements of A differs modulo m from all the other elements of their column, and where A can be written as matrix product BC where B is an n x t matrix, C is a t x n matrix, where t is less than n;

(b) encoding the length-n vector x to the length-t vector xB, by vector-matrix product modulo m;

(c) transmitting the coordinates of the length-t vector xB on t channels;

(d) retrieving the coordinates of the vector by computing xBC=xA by vector-matrix product modulo m;

(e) for every coordinate of vector xBC=xA, filtering out the terms added as the linear combination of other coordinates of vector x.

[c2] A method according to claim 1, wherein the modulus m is non-prime- power composite positive integer, the di-

agonal elements of matrix A are non-zero modulo any prime-divisors of m, and each non-diagonal elements of matrix A are zero modulo for at least one prime divisor of m.

[c3] A method according to claim 2, wherein the filtering step for retrieving the original values of the transmitted 0-1 vector further comprising:

(a) periodical change of the values of the coordinates of vector x with original value equal to 1 on values 0,1,2,...,m-1 in this order, and on values of m-1,m-2,...,3,2,1,0 in this order of the coordinates of vector x with original value equal to 0;

(b) measuring the periodicity of each coordinates of vector xBC=xA;

(c) if a coordinate has period less than m then it is be neglected;

(d) if a coordinate has period equal to m, and it changes its values as 0,1,2,...,m-1, then its original value was 1;

(e) if a coordinate has a period equal to m, and it changes its values as m-1,m-2,...,3,2,1,0, then its original value was 0.

[c4] A method, according to claim 3, wherein the periodic change of the discrete values of the coordinates of vector x are approximated by continuous wave forms of electronic, magnetic or optical signals.

[c5] A method, according to claim 1, wherein between the communicating nodes R_1, R_2, ...,R_n and S_1, S_2, ...,S_n two networks are constructed, in the first network nodes S_1, S_2, ...,S_n play the role of the senders and R_1, R_2, ...,R_n play the role of the receivers, and in the second network R_1, R_2, ...,R_n play the role of the senders and S_1, S_2, ...,S_n play the role of the receivers.

[c6] A method, according to claim 1, wherein the filtering step for retrieving the original values of the transmitted 0-1 vector further comprising:

(a) change of the values of the coordinates of vector x with original value equal to 1 to value 0, and the coordinates of vector x with original value equal to 0 to 1;

(b) measuring the change of each coordinates of vector xBC=xA;

(c) if the change in the value of in coordinate i (where integer i is between 1 and n) is not the ith diagonal element of matrix A modulo m or not (-1)-times the ith diagonal element of matrix A modulo m, then the change is neglected;

(d) if the change in the value in coordinate i (where integer i is between 1 and n) is the ith diagonal element of matrix A modulo m then original value was 0;

(e) if the change in the value in coordinate i (where integer i is between 1 and n) is (-1)-times the ith diagonal

element of matrix A modulo m then original value was 1.